

What is claimed is:

1. A reaction and stirring apparatus comprising:

a pair of impermeable supports;

a pair of spacer members engaging the end sections of said

5 pair of impermeable supports for providing a predetermined distance between said pair of impermeable supports; and

a stirrer provided within a space defined by said pair of impermeable supports and said pair of spacer members; wherein,

said stirrer includes:

10 a stirring axis;

a driving source for oscillating said stirring axis; and

a plurality of stirring blades mounted on said stirring axis.

2. A reaction and stirring apparatus of claim 1, wherein,

15 a cut section is provided at a portion of each of said stirring blades such that an object can be circulated at the space between said stirring blade and the inner wall of said spacer member and/or at the space between said stirring blade and the inner wall of said impermeable support.

20 3. A reaction and stirring apparatus of claim 1, wherein,

a circulation path through which a heat exchange medium can be circulated is provided on at least one of the outer walls of said impermeable supports and spacer members.

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4. A reaction and stirring apparatus of claim 2, wherein,
a circulation path through which a heat exchange medium can
be circulated is provided on at least one of the outer walls of
said impermeable supports and spacer members.

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5. A reaction and stirring apparatus of claim 2, wherein,
said cut sections are one or more holes alternately provided
on the right and left ends of each of said stirring blades so that
said permeating object can be circulated between said stirring
10 blades and said inner wall of spacer member.

6. A reaction and stirring apparatus of claim 2, wherein,
said cut sections are alternately provided at the front and
rear ends of each of said stirring blades so that said permeating
15 object can be circulated between said stirring blade and inner wall
of said impermeable support.

7. A reaction and stirring apparatus of claim 1, wherein,
a plurality of barriers are provided on and protruding from
20 said spacer member, said barriers and said stirring blade being
alternately placed, and

a gap is provided such that said permeating object can be
circulated, said gap defined by said stirring blade, said barrier,
and the inner wall of said spacer member.

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8. A reaction and stirring apparatus of claim 1, wherein,
at least one inlet and one outlet are provided at the top and
bottom of said reaction and stirring apparatus, for respectively
introducing a material into said space and retrieving a material
5 from said space; and

at least one hole is provided on said spacer member for
introducing or retrieving a material.

9. A reaction and separating filtration apparatus,
10 comprising:

a pair of impermeable supports;

a pair of spacer members engaging the end sections of said
pair of impermeable supports, for providing a predetermined
distance between said pair of impermeable supports;

15 a permeable membrane provided within a space defined by said
pair of impermeable supports and said pair of spacer members;

an outlet provided on at least one of said impermeable members,
to connect said space with outside for letting permeated material
that has permeated through said permeable membrane flow out; and

20 a stirrer provided within said space on the permeating object
side of said permeable membrane; wherein,

said stirrer includes:

a stirring axis;

a driving source for oscillating said stirring axis; and

25 a plurality of stirring blades mounted on said stirring axis.

10. A reaction and separating filtration apparatus of claim 9, wherein,

a cut section is provided on a portion of each of said stirring blades such that said permeating object can be circulated at the space between said stirring blades and inner wall of said spacer member, the space between said stirring blades and inner wall of said impermeable support, and/or the space between said stirring blades and said permeable membrane, and

said cut sections are one or more holes alternately provided on the right and left ends of each of said stirring blades so that said permeating object can be circulated between said stirring blades and inner wall of said spacer member.

11. A reaction and separating filtration apparatus of claim 9, wherein,

a cut section is provided on a portion of each of said stirring blades such that said permeating object can be circulated at the space between said stirring blades and inner wall of said spacer member, the space between said stirring blades and inner wall of said impermeable support, and/or the space between said stirring blades and said permeable membrane, and

said cut sections are alternately provided on the front and rear ends of each of said stirring blades so that said permeating object can be circulated between said stirring blades and inner

wall of said impermeable support.

12. A reaction and separating filtration apparatus of claim 9, wherein,

5 a plurality of barriers are provided on and protruding from said spacer member, said barriers and said stirring blades being alternately placed, and

a gap is provided such that said permeating object can be circulated, said gap defined by said stirring blade, said barrier, and inner wall of said spacer member.

13. A reaction and separating filtration apparatus of claim 9, wherein,

15 a circulation path through which a heat exchange medium can be circulated is provided on at least one of the outer walls of said impermeable supports and said spacer members.

14. A reaction and separating filtration apparatus, comprising at least two reaction and separating filtration apparatuses of claim 9 provided in parallel.

15. A reaction and separating filtration apparatus of claim 14, wherein,

25 a circulation path in which a heat exchange medium can be circulated is provided between adjacent reaction and separating

filtration apparatuses.

16. A reaction and separating filtration apparatus of claim 9, wherein,

5 at least one inlet and one outlet are provided at the top and bottom of said reaction and stirring apparatus for respectively introducing a material into said space and retrieving a material from said space; and

10 at least one introduction hole is provided on said spacer member for insertion or retrieval of a material.

17. A method for purifying a reactant, comprising the steps of,

oscillation stirring materials to be reacted, and

15 while oscillation stirring, differentiating and collecting the product via a permeable membrane, said product generated by the reaction.

18. A method for mixing and separating an emulsion comprising 20 the step of differentiating and collecting, via a permeable membrane, an emulsion having a particle radius within a predetermined range, from the emulsions.

19. A method for mixing and separating an emulsion comprising 25 the steps of,

oscillation stirring and mixing an oil phase and a water phase,
and

while oscillation stirring, differentiating and collecting,
via a permeable membrane, an emulsion having a particle radius
5 within a predetermined range from generated emulsions.

20. A method for separating a particulate material or a
powdery material, comprising the step of differentiating and
collecting, via a permeable membrane, a particulate material or
10 a powdery material having a particle radius within a predetermined
range, from the particulate materials and powdery materials.

21. A method for filtering and extracting, wherein the
filtration and extraction are performed via a permeable membrane
15 while oscillation stirring.

22. A method for separating a macromolecule, comprising the
steps of

allowing a polymerization reaction to occur while oscillation
20 stirring, and

separating a macromolecule via a permeable membrane.

23. A reactant purification method of claim 17, wherein said
reaction purification is performed using an apparatus of claim 9.

25 24. An emulsion mixing and separating method of claim 18,

wherein mixing and separation are performed using an apparatus of claim 9.

25. An emulsion mixing and separating method of claim 19,
5 wherein mixing and separation are performed using an apparatus of claim 9.

26. A separating method of particulate material or powdery
material of claim 20, wherein the separation of a particulate
10 material or a powdery material is performed using an apparatus of claim 9.

27. A filtration and extraction method of claim 21, wherein
filtration and extraction are performed using an apparatus of claim
15 9.

28. A macromolecule separation method of claim 22, wherein
the macromolecule separation is performed using an apparatus of
claim 9.

29. A method for reverse osmosis filtration, wherein the
reverse osmosis filtration is performed using an apparatus of claim
20 9.

30. A method for ultrafiltration, wherein the

ultrafiltration is performed using an apparatus of claim 9.

31. A reaction and stirring apparatus of claim 1, wherein,
said stirring blades are vertical fins integrated into said
5 stirring axis and provided in parallel with said impermeable
supports; and

irregularities are formed on the surfaces of said stirring
blades.

10 32. A reaction and stirring apparatus of claim 1, wherein,
said stirring blades are provided in parallel with said
impermeable supports and are a pair of vertical fins provided on
both sides of said stirring axis in the radial direction; and

15 irregularities are formed on the surfaces of said stirring
blades.

20 33. A reaction and separating filtration apparatus of claim
9, wherein,

said stirring blades are vertical fins integrated into said
stirring axis and provided in parallel with said impermeable
supports; and

irregularities are formed on the surfaces of said stirring
blades.

25 34. A reaction and separating filtration apparatus of claim

9, wherein

said stirring blades are provided in parallel with said impermeable supports and are a pair of vertical fins provided on both sides of said stirring axis in the radial direction; and

5 irregularities are formed on the surfaces of said stirring blades.

35. A reaction and stirring apparatus of claim 1, wherein at least one channel is formed on the side surface of each of said stirring blades which faces said impermeable supports.

36. A reaction and separating filtration apparatus of claim 9, wherein at least one channel is formed on the side surface of each of said stirring blades which faces said impermeable supports.